

REMARKS

The Applicants have carefully reviewed and considered the Office Action of March 9, 2001 including the various prior art documents cited by the Examiner. In response the Applicants first wish to confirm the election of claims 1-15 for substantive examination in this patent application and hereby cancel claims 16-18 from this application without prejudice. The Applicants, of course, maintain the right to pursue patent protection to the method of forming a superabsorbent, water-resistant coating on an article as set forth in claims 16-18 in a subsequently filed divisional patent application. The applicants also note the filing of a Request For A Two Month Extension of Time to allow the timely filing of this Amendment in response to the March 9, 2001 Office Action.

Turning now to the substantive issues, claims 1-3 and 8 very clearly patentably distinguish over the Kono et al. (JP 04284236) or Shiono et al. (JP 06289262) references. Specifically, the Kono et al. reference discloses a cable including a water absorbing composition layer 2 formed on a substrate 1 from a water-absorbing resin 3 and a binder 4 blended with the resin. Kono et al. does not teach any form of article having at least one surface covered by a water-resistant coating including a water-soluble superabsorbent polymer precursor as claimed in claim 1. Further, since the Kono et al. reference teaches coating with a water absorbing resin rather than a precursor the Kono et al. reference actually teaches away from the present invention and supports the patentability thereof. Thus, claim 1 patentably distinguishes over this art and should be allowed. This is also true of claims 2 and 3 which depend from claim 1 and,

therefore, are equally allowable for at least the same reasons.

Claim 8 refers to a water-resistant coating comprising a superabsorbent water-soluble polymer, wherein the superabsorbent polymer is obtained as an aqueous solution of a polymer precursor and a binder and is cured to form a superabsorbent polymer. The Kono et al. reference discloses a cable with a water absorbing composition layer 2 incorporating a water absorbing resin 3 blended with a binder 4. There is no teaching or suggestion whatsoever in the English abstract of the Kono et al. reference related in any way to the provision of a superabsorbent polymer obtained as an aqueous solution of a polymer precursor and a binder. Accordingly, the Kono et al. reference provides no basis for the rejection of claim 8 which, therefore, should be allowed.

The same is true of the Shiono et al. reference. The Shiono reference relates to an optical fiber cable spirally wound with a water absorbing tape 9 formed by coating the surface of the tape substrate with the powder of a water absorbing polymer and particles of an inorganic antibacterial agent or sterilizing agent dispersed in a rubber based binder. It is significant to note that, like the Kono et al. reference, the Shiono et al. reference teaches the provision of a water absorbing polymer in a binder rather than a polymer precursor as claimed. Thus, like the Kono et al. reference, the Shiono et al. reference clearly teaches away from the present invention and, accordingly, actually supports the patentability of claim 1.

One skilled in the art reviewing either the Kono et al. or Shiono et al. references would mix a water absorbing polymer with a resin rather than a polymer precursor as set forth in the present claims. Accordingly, claim 1 as

well as claims 2 and 3 dependent thereon very clearly patentably distinguish over this art and should be allowed. The same is also true of independent claim 8 which likewise references a polymer precursor.

Claims 1-6 and 8 also very clearly patentably distinguish over the Kroesbergen (WO 96/23024) or Manning et al. (USPN 5,071,681) references. The Kroesbergen reference does not in any way suggest the claimed invention. The Kroesbergen reference does not teach or suggest combining a superabsorbent polymer precursor that, when cured, forms a superabsorbent polymer that absorbs water when it is exposed to an aqueous environment and desorbs water when it is dried, in combination with a film forming binder as set forth in claim 1. Accordingly, the Kroesbergen reference fails to provide an appropriate basis to support an anticipation rejection under 35 U.S.C. §102.

Further, it should be appreciated that the Kroesbergen composition is applied as a paste, using a screen printing technique, rather than in solution form. As such, Kroesbergen teaches that adding a film forming binder as presently claimed to provide a composition that may be applied to cover a surface would not be desirable. As such it is very clear that claim 1 patentably distinguishes over the Kroesbergen reference and should be formally allowed. Of course, the same is also true of claims 2-6 which depend from claim 1 and, therefore, are equally allowable for at least the same reasons.

Independent claim 8 is likewise allowable over the Kroesbergen reference since, as pointed out above, the Kroesbergen reference does not in any way teach or suggest a superabsorbent polymer obtained as an aqueous solution of a polymer precursor and a binder that is subsequently cured. Thus,

claim 8 should also be allowed.

Similarly, claims 1-6 and 8 very clearly patentably distinguish over the Manning et al. reference. The Manning et al. reference discloses a water absorbent fiber web having a hydrophilic polymer applied as a liquid and cross linked after application to the web. In this particular embodiment no binder is present. In an alternative embodiment the fibrous web is treated on one side with a latex bonding agent and on the other side with a polymer capable of cross linking or complexation to form an absorbent polymer. In neither instance does Manning teach or in any way suggest the provision of an article having at least one surface covered by a water resistant coating comprising a water-soluble superabsorbent polymer precursor and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof as explicitly set forth in claim 1. Accordingly, claim 1 as well as claims 2-6 dependent thereon clearly patentably distinguish over the Manning et al. reference.

Similarly, independent claim 8 also patentably distinguishes since the Manning et al. reference clearly does not disclose the concept of obtaining a superabsorbent polymer as an aqueous solution of a polymer precursor and a binder that is subsequently cured. This aspect of the present invention as set forth in claim 8 is clearly not taught or suggested in the Manning et al. reference and, accordingly, claim 8 patentably distinguishes over the art and should be allowed.

Claims 9-15 also very clearly patentably distinguish over the Kono et al., Shiono et al., Kroesbergen and Manning et al. references for the reasons

noted above. Simply stated the cited art fails to teach or suggest the claimed invention. The concept of providing a water-soluble superabsorbent polymer precursor and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof is just not found in these references.

Additionally, these references fail in any way to teach or suggest a superabsorbent water-soluble polymer which after curing absorbs up to about 400 lbs. its initial dry weight in water when immersed in an aqueous environment and desorbs water when the coating is dried as set forth in claim 9.

For example, the Kroesbergen et al. reference teaches a superabsorbent material having a swelling capacity of about 1 mm per 10 g/m² in tap water (note page 7 lines 15-17). In comparison, the superabsorbent polymer in the coating of the present invention as set forth in claim 9 absorbs up to about 400 times its initial dry weight in water when immersed in an aqueous environment. Accordingly, the coating of the present invention must swell to a much greater volume than the material disclosed in the Kroesbergen et al. reference. Upon review and careful consideration it is believed the Examiner will therefore agree that claims 9-15 clearly patentably distinguish over the cited references and should also be formally allowed.

Claims 1-5 and 8-15 also patentably distinguish over the Gaa et al. (USPN 4,810,576) or Cossement et al. (USPN 5,236,982) references. At column 3 lines 20-27, it is stated that one objective of the Gaa et al. patent is to provide nonwoven, sheet-like mats having appropriate properties for use as base materials for roofing products such as shingles. Obviously, in such an

application the superabsorbency of the present invention would be an absolute detriment due to potential overloading for the roof structure from the weight of water absorbed. In fact, the Gaa et al. reference discloses a composition that produces a water resistant, hydrophobic material that sheds water on contact. This is the exact opposite of the present invention and totally teaches away from the present invention.

In the Gaa et al. patent the polyacrylics, polyacrylamides and/or polyamides are reacted with urea formaldehydes and/or silanes as specifically described at column 7 line 58 to column 8 line 42. Essentially, the reaction explicitly described and taught in the Gaa et al. patent is the antithesis of the presently claimed invention and it is absolutely unreasonable and illogical to consider the present invention either anticipated or obvious in view of the teachings of this patent.

More specifically, in Gaa et al., the polyacrylamide or polyamide react with urea formaldehyde and the silane forming a tightly bonded network which is not possibly superabsorbent. For a product to be superabsorbent it must have the ionic bonding structure of a salt. These ionic bonds are broken preferentially for the water molecule. Thus the polymer "unzips" making room for the absorbence of even more water. The Gaa et al. patent teaches nothing of the forming of a salt or ionic bonding or any other type of easily broken bond that could lead to superabsorbency. Thus, logic dictates that the Gaa et al. composition is not nor could it be intended to be superabsorbent. In view of these comments it is believed that the Examiner will agree that the Gaa et al. patent not only fails to teach or suggest the present invention, this reference

actually teaches away from the present invention and, therefore, supports its patentability. Accordingly, claims 1-5 and 8-15 clearly define over the Gaa et al. reference and should be allowed.

The Cossement et al. reference does not in any way teach or suggest the claimed invention. The Cossement et al. reference does not teach or suggest a superabsorbent precursor. The Cossement reference relates to a sizing composition for coating reinforcing polyamide resins. The Cossement reference does not mention or even suggest that the composition may be used in an end-use application as a coating exposed to an external environment, which absorbs water as a means of protecting the coated surface from water permeation. In fact, the coating composition protects the fibers during processing including chopping and it is not used in any way to protect the fibers against water permeation. It should be appreciated that the composition disclosed in the Cossement et al. reference includes organo-silane coupling agents. As noted above with respect to the Gaa et al. reference, these agents actually promote the formation of a material from the polyacrylic acid that is not superabsorbent and, accordingly, it should be appreciated that the Cossement et al. reference forms no basis whatsoever for rejecting the present claims.

Finally, claims 1-15 are very clearly patentably distinguishable over the Arroyo et al. (USPN 4,913,517) or Geursen et al. (USPN 5,264,251) references when considered in combination with the Barch et al. (USPN 4,466,151) reference. The Arroyo et al. and Geursen et al. references both fail to teach or suggest the use of a viscosity modifying agent or a film forming binder selected

from a group consisting of polyesters, polyurethanes, epoxys, latex and mixtures thereof. The Barch et al. reference does not teach the use of a superabsorbent water-soluble precursor that cures to form a superabsorbent water-soluble polymer that absorbs large quantities of water, as it would be undesirable to attract water to the coating that would decrease the wet-out and miscibility of the fibers when they are molded or otherwise combined with polymers.

More specifically, the superabsorbent coating proposed in the Arroyo et al. reference is impregnated into a substrate tape or sheath of spun bonded non-woven plastic resin that is placed between a metallic shield and strength members in a communications cable. As stated in the Arroyo et al. patent at column 5 lines 60-68, and column 6 lines 1-4 and 43-49, cross-linking density and water absorbency are the two competing factors necessary for this superabsorbent coating. It is not suggested that a film forming binder or even a viscosity modifying agent would improve these properties of the coating, and adding these ingredients for other reasons is not contemplated. As such, the Arroyo et al. reference does not teach or suggest an article having at least one surface covered by a water resistant coating comprising a water-soluble superabsorbent polymer precursor, optionally a viscosity modifying agent and a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof as set forth in claim 1. Similarly, the Arroyo et al. reference fails to teach or suggest the provision of a water resistant coating wherein the superabsorbent polymer is obtained as an aqueous solution of a polymer precursor and a binder that is subsequently cured as set forth in independent

claim 8. As such these claims clearly patentably distinguish over this reference. Since the Barch reference does not in any way relate to a superabsorbent polymer coating the teachings in this secondary reference do not overcome the shortcomings noted above with respect to the Arroyo et al. reference and the patentability of the claims is therefore conclusively established.

The Geursen et al. reference does not suggest the use of a film forming binder or a viscosity modifying agent and as such forms no proper basis for the rejection of the present claims. The Geursen et al. reference teaches the coating of an aramid yarn in a water-and-oil emulsion containing a superabsorbent material. It does not suggest use in applications where water exposure contact is likely, and as such the properties necessary for an aramid yarn are necessarily different than the applications where the present invention may be used. Also, a viscosity modifying agent or a film forming binder may affect HLB (hydrophile-lipophile balance) of the water-in-emulsion, and as such these ingredients may in fact be undesirable. Certainly, the Barch patent, which is completely unrelated to superabsorbent materials, provides no relevant teaching for modifying what is taught in the Geursen et al. reference.

Accordingly, to add a viscosity modifying agent or a film forming binder to Geursen would not be obvious. As such, whether considered alone or in combination with Barch, the Geursen et al. reference does not teach or suggest an article having at least one surface covered by a water resistant coating including a water-soluble superabsorbent polymer precursor, optionally a viscosity modifying agent and a binder selected from a group consisting of

polyester, urethane, epoxy, latex and mixtures thereof. Similarly the Geursen et al. reference whether considered alone or in combination does not teach or suggest a water resistant coating comprising a superabsorbent water-soluble polymer wherein that polymer is obtained as an aqueous solution of a polymer precursor and a binder. As such independent claims 1 and 8 very clearly patentably distinguish over this art as do claims 2-7 and 9-15 dependent thereon. Accordingly, all the claims should be formally allowed.

In summary, the pending claims clearly patentably distinguish over the prior art. Upon careful review and consideration it is believed the Examiner will agree with this proposition. Accordingly, the early issuance of a formal Notice of Allowance is earnestly solicited. If any fees are required pertaining to this Response, the Applicants requests that they be charged to Deposit Account number 50-0568.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application

Applicant: Martin C. Flautt et al.

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For: SUPERABSORBENT WATER-
RESISTANT COATINGS

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims

1. (Amended) An article having at least one surface covered by a water-resistant coating comprising:
a water-soluble superabsorbent polymer precursor;
optionally a viscosity modifying agent; and
a binder selected from a group consisting of polyester, urethane, epoxy, latex and mixtures thereof.

8. (Amended) A water-resistant coating comprising a superabsorbent water-soluble polymer, wherein the superabsorbent polymer is obtained as an aqueous solution of a polymer precursor and a binder and is cured to form a superabsorbent polymer.